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A6H HLJ HLN

(56) Documents Cited:
GB 2292246 A GB 2083936 A
EP 1260928 A US 5967892 A

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Other: Online: EPODOC, JAPIO, WPI

(54) Abstract Title: **Gaming machine with interacting video and mechanical displays**

(57) In a gaming machine, such as one having mechanical or simulated reels 12, a further game comprises interacting mechanical and video displays 28, 26 respectively. The mechanical display 28 has a movable physical element, in the form of the claw of a crane or "grab" game. When this is lowered behind the video display 26, a claw, similar in appearance, appears in the video image. The video display may depict the claw grabbing prizes which will then be translated in to an award of credits. Instead of the crane game the mechanical and video displays may comprise a fishing rod and a display of fish.

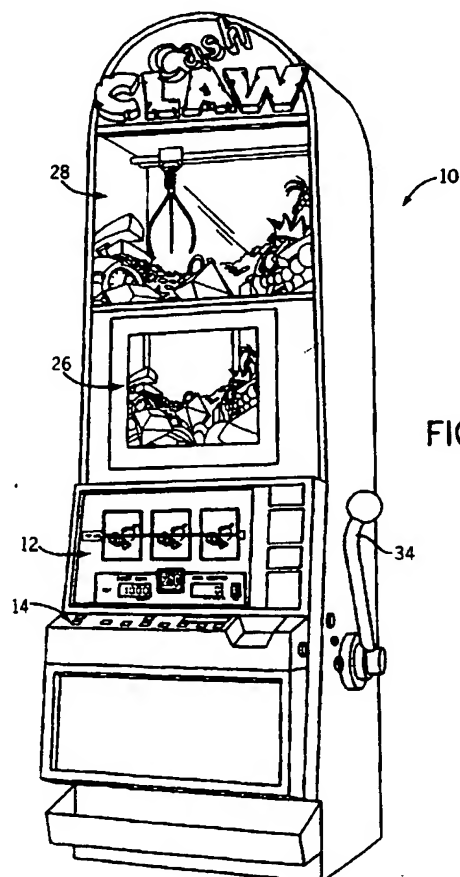
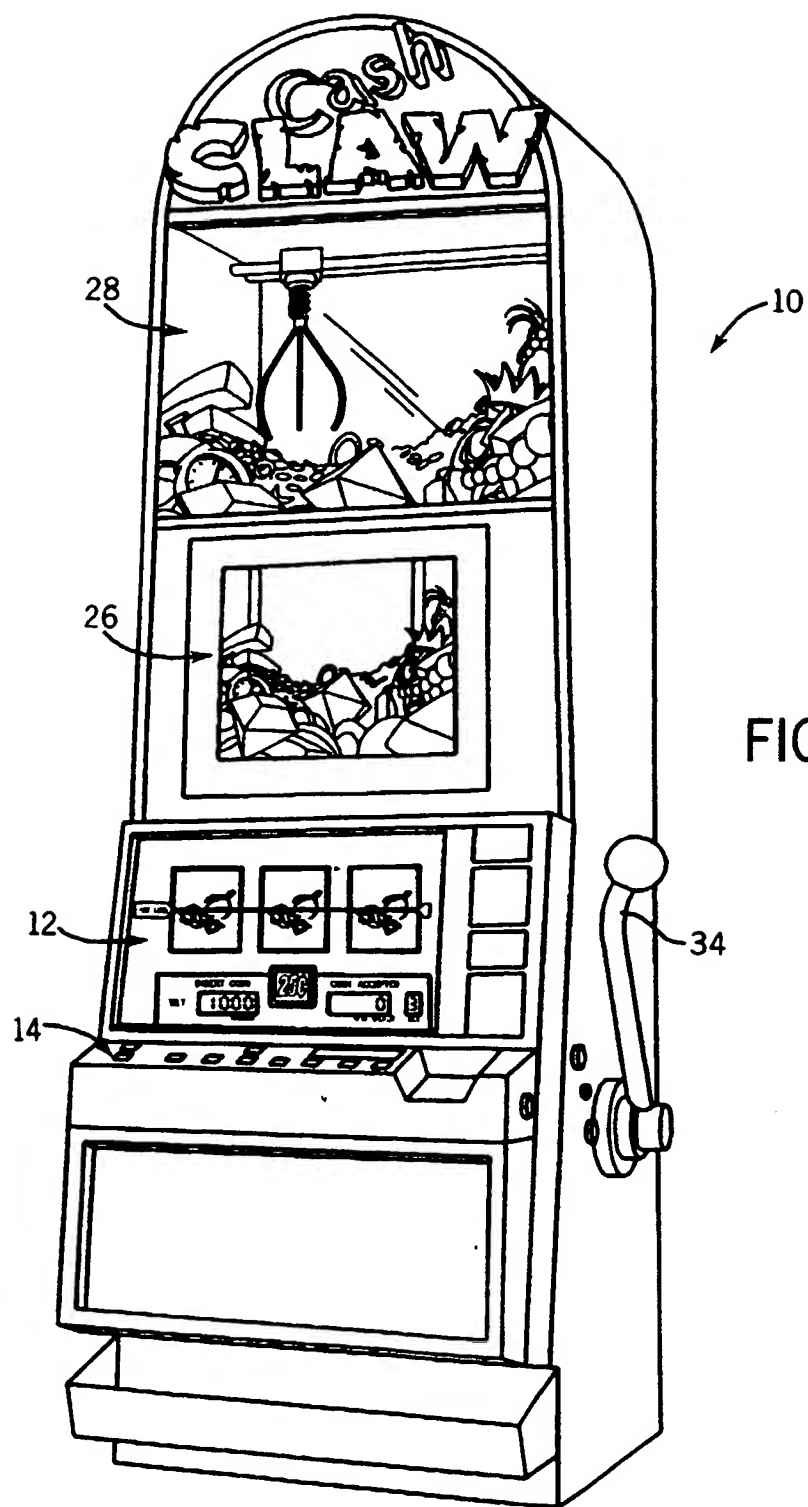


FIG. 1

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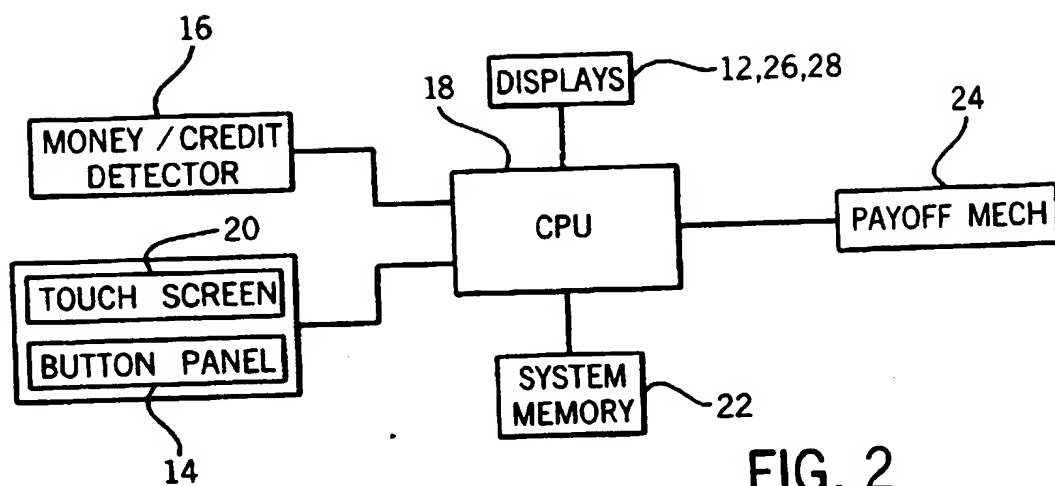


FIG. 2

FIG. 3

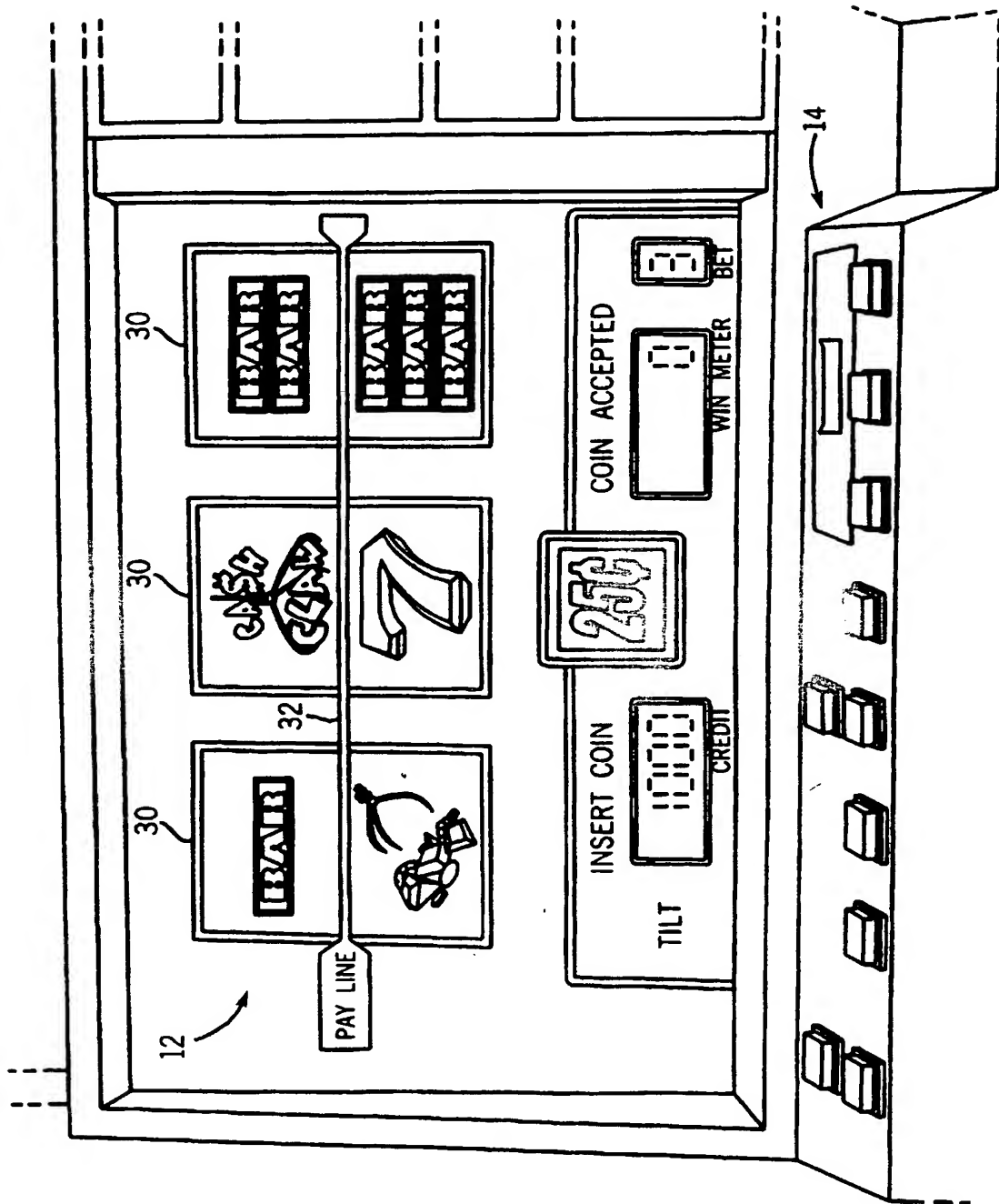


FIG. 4

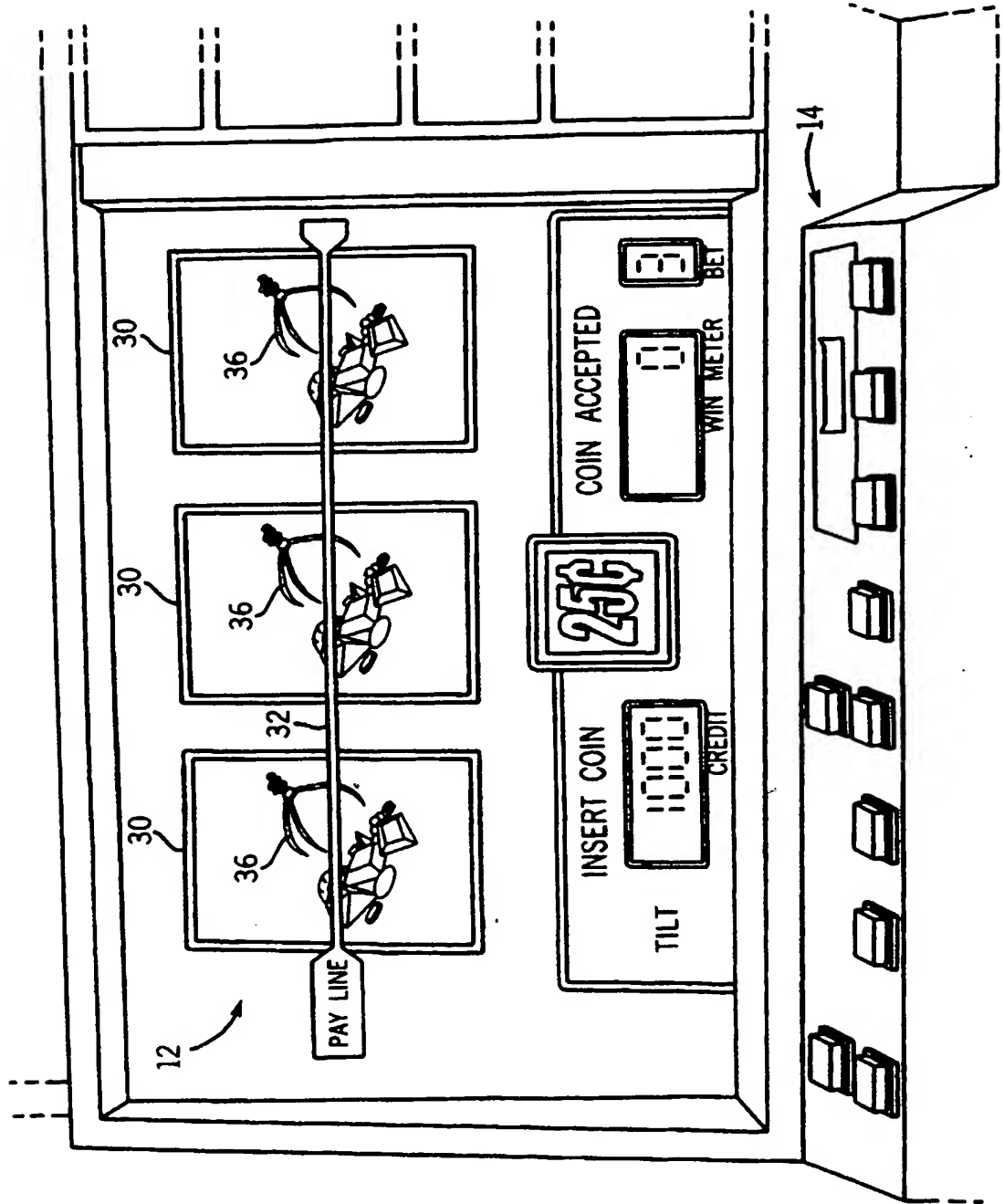
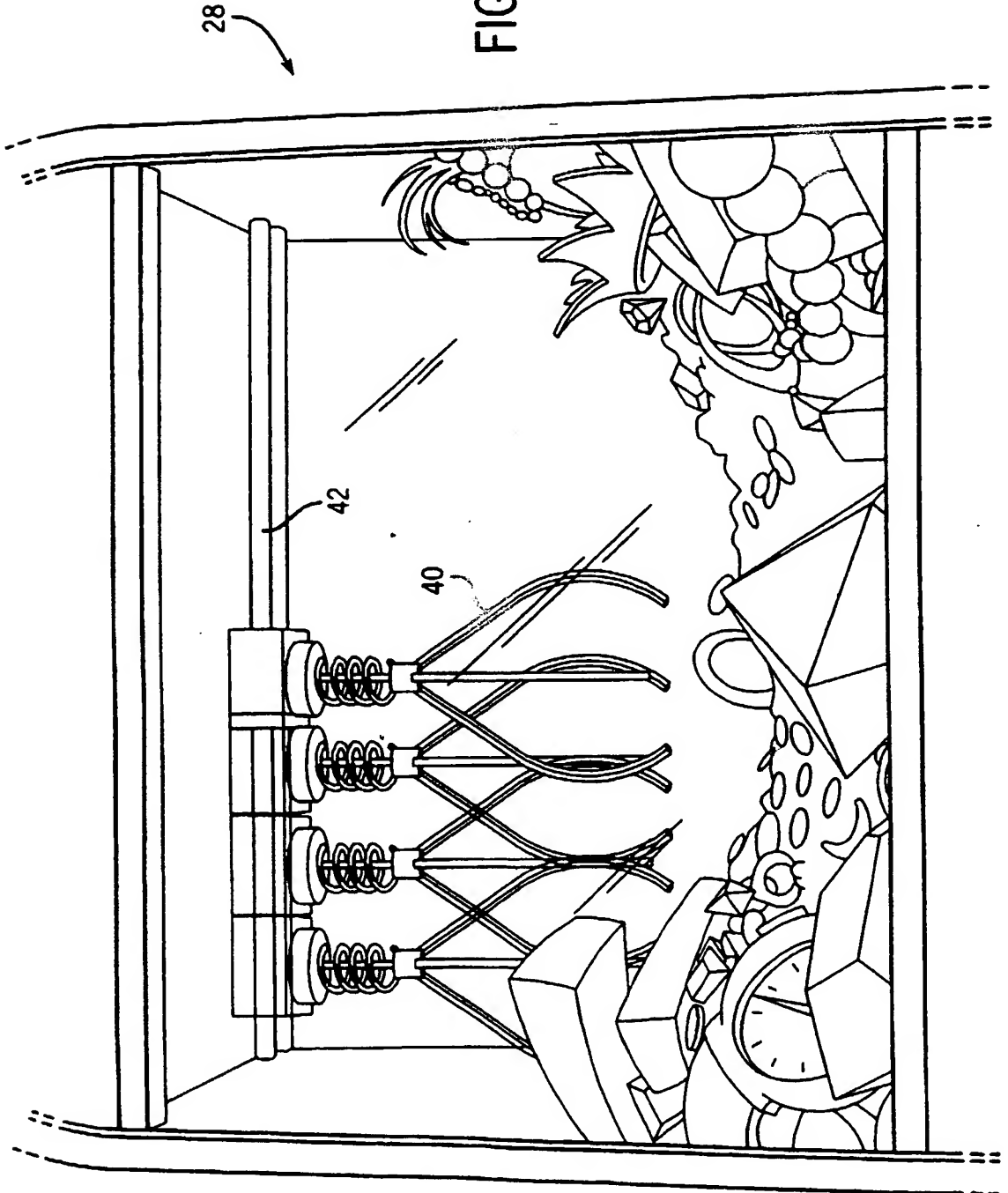


FIG. 5



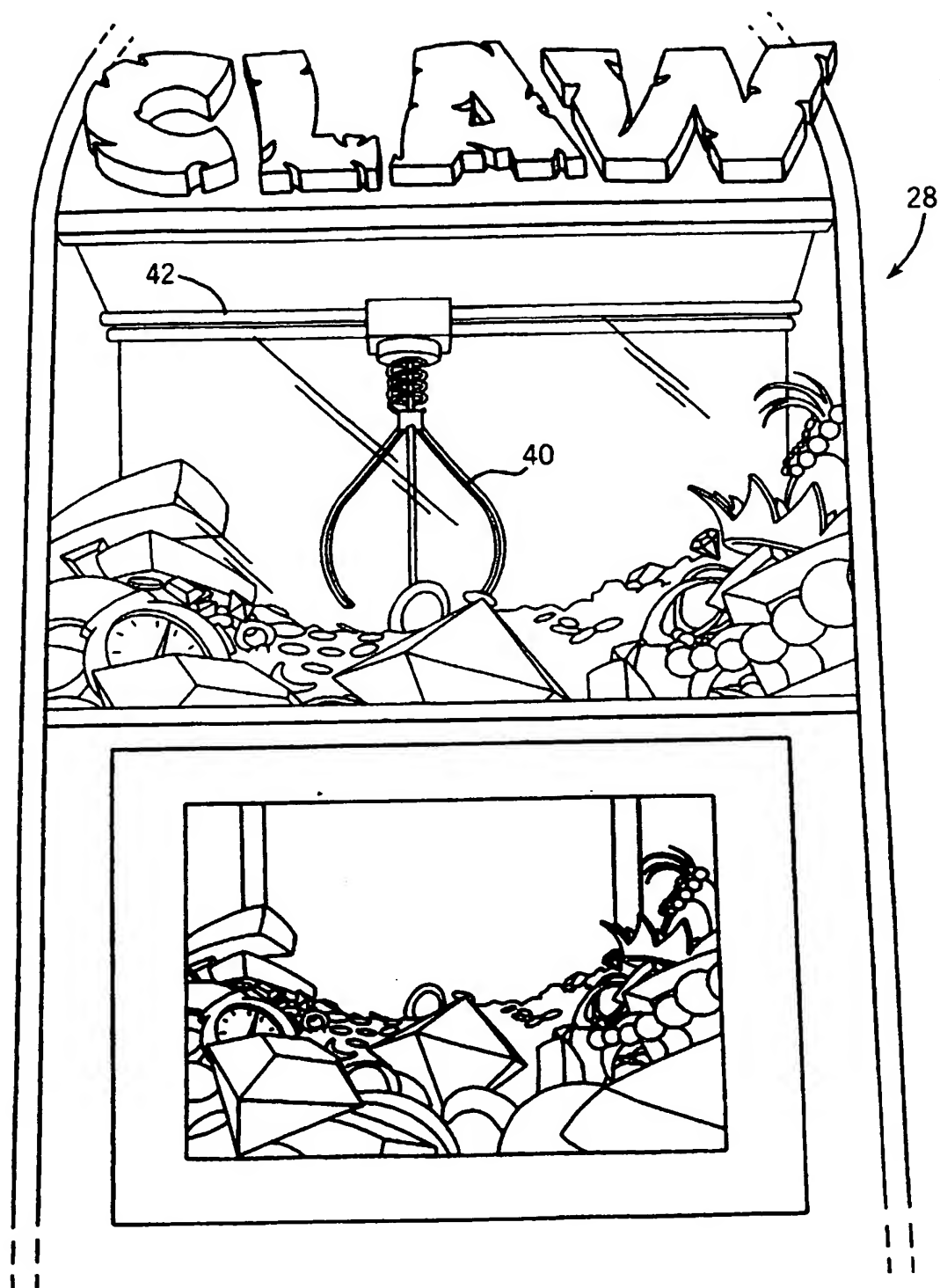


FIG. 6

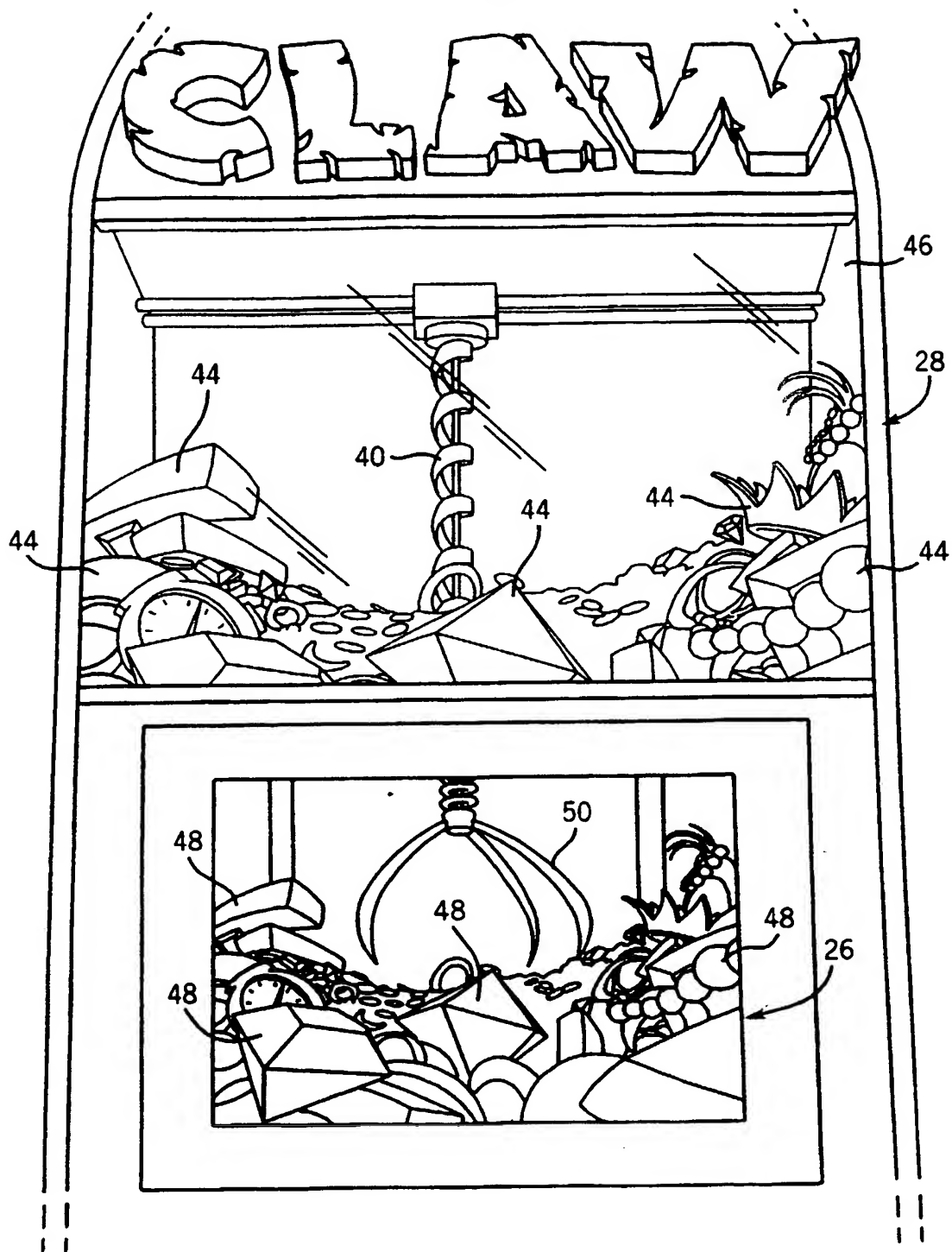
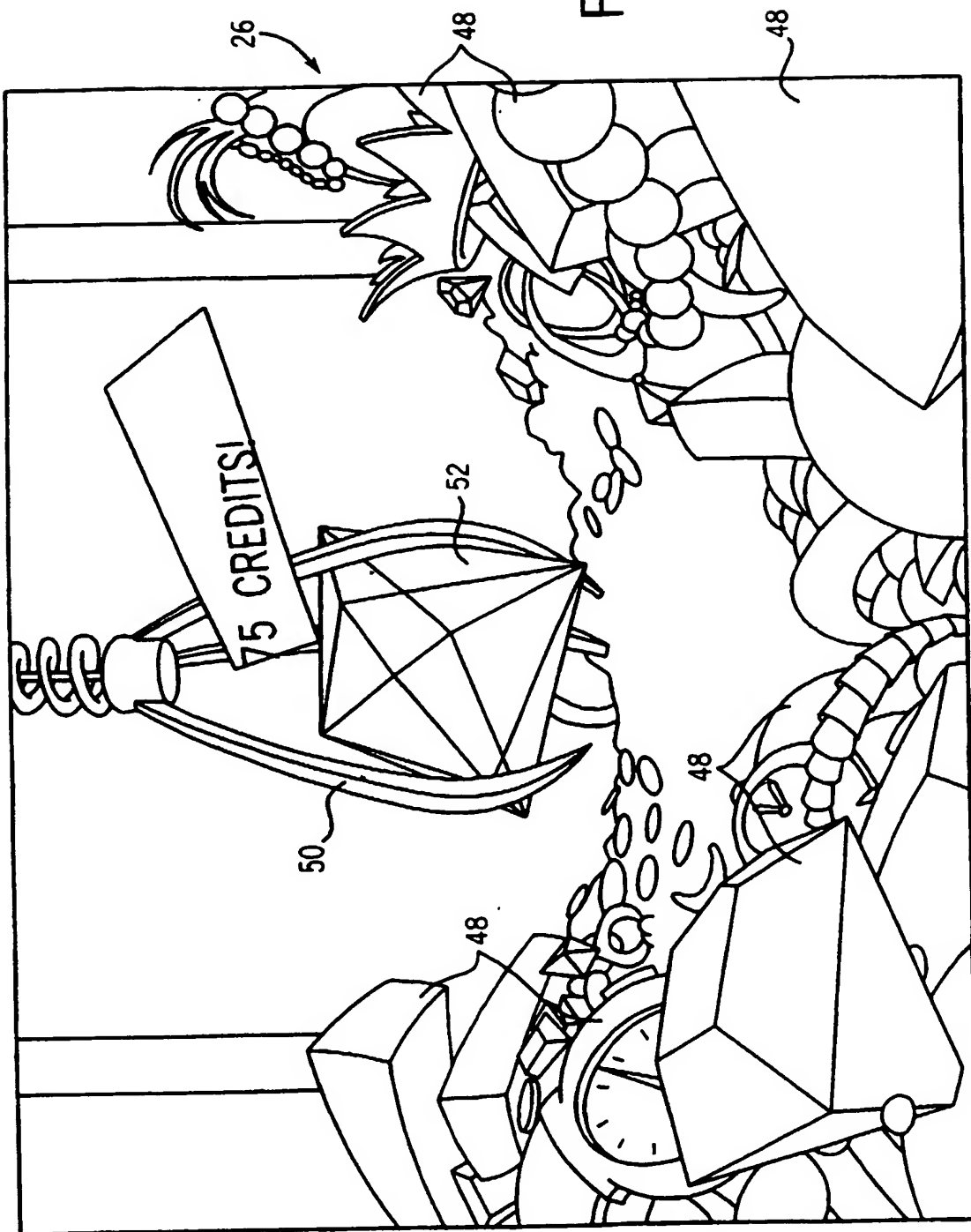


FIG. 7

FIG. 8



GAMING MACHINE WITH INTERACTING VIDEO AND MECHANICAL DISPLAYS

FIELD OF THE INVENTION

The present invention relates generally to gaming machines and, more particularly, to a gaming machine including interacting video and mechanical displays.

BACKGROUND OF THE INVENTION

Gaming machines, such as slot machines, video poker machines and the like, have been a cornerstone of the gaming industry for several years. Generally, the popularity of such machines with players is dependent on the likelihood (or perceived likelihood) of winning money at the machine and the intrinsic entertainment value of the machine relative to other available gaming options. Where the available gaming options include a number of competing machines and the expectation of winning each machine is roughly the same (or believed to be the same), players are most likely to be attracted to the most entertaining and exciting of the machines. Shrewd operators consequently strive to employ the most entertaining and exciting machines available because such machines attract frequent play and hence increase profitability to the operator. Accordingly, in the competitive gaming machine industry, there is a continuing need for gaming machine manufacturers to produce new types of games, or enhancements to existing games, which will attract frequent play by enhancing the entertainment value and excitement associated with the game.

To enhance the entertainment value of a gaming machine, gaming machines often include features such as an enhanced payoff and a "secondary" or "bonus" game which may be played in conjunction with a "basic" game. The bonus game may comprise any type of game, either similar to or completely different from the basic game, which is entered upon the occurrence of a selected event or outcome of the basic game. Generally, the features provide a greater expectation of winning than the basic game.

To attract players, more attractive or unusual video displays, mechanical/physical displays, and/or audio accompany the basic and bonus games. The fanciful and visually appealing displays offer tremendous advantages in player

appeal and excitement relative to other known games. Additionally, such games are attractive to both players and operators. Thus, there is a continuing need to develop new features for the displays and the basic and bonus games to satisfy the demands of players and operators. Preferably, such new features will maintain, or even further enhance, the level of player excitement. The present invention is directed to satisfying these needs.

SUMMARY OF THE INVENTION

A gaming machine for conducting a wagering game comprises a video display for displaying a video element, a mechanical display for displaying a movable physical element, and a control system. The control system operates the video display and the mechanical display such that the video element and the physical element appear to visually interact with each other. A method of conducting the wagering game using the video and mechanical displays is also disclosed.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other advantages of the invention will become apparent upon reading the following detailed description and upon reference to the drawings.

FIG. 1 is an isometric view of a gaming machine embodying the present invention.

FIG. 2 is a block diagram of a control system suitable for operating the gaming machine.

FIG. 3 is an enlarged front view of a main slot reel display of the gaming machine.

FIG. 4 is an enlarged front view of the main slot reel display showing an outcome for triggering a bonus game.

FIG. 5 is an enlarged front view of a mechanical display of the gaming machine, wherein a physical claw is shown in a retracted position.

FIG. 6 is a front view of the mechanical display and a video display beneath the mechanical display, wherein the physical claw is still shown in the retracted position but is ready to be lowered (extended).

FIG. 7 is a front view of the mechanical and video displays, wherein the physical claw has been lowered until it disappears and reappears as a video claw on the video display.

FIG. 8 is an image on the video display showing the video claw grabbing a prize to yield a bonus.

While the invention is susceptible to various modifications and alternative forms, specific embodiments have been shown by way of example in the drawings and will be described in detail herein. It should be understood, however, that the invention is not intended to be limited to the particular forms disclosed. Rather, the invention is to cover all modifications, equivalents, and alternatives falling within the scope of the invention as defined by the appended claims.

DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

Turning now to the drawings, FIG. 1 depicts a gaming machine 10 operable to conduct a wagering game such as slots, poker, keno, bingo, or blackjack. In operation, the gaming machine receives a wager from a player to purchase a "play" of the game. In a "play" of the game, the gaming machine generates at least one random event using a random number generator (RNG) and provides an award to the player for a winning outcome of the random event. The random event(s) varies with the type of wagering game conducted on the gaming machine.

The gaming machine 10 includes a main display 12 and a pair of secondary displays 26 and 28. The main display 12 may be a mechanical spinning reel display or a video display. The secondary display 26 is preferably a video display positioned above the main display 12. The secondary display 28 is preferably a mechanical display positioned above the video display 26. Any video display may be implemented with a CRT, LCD, plasma, or other type of video display known in the art. The display 12, especially if implemented in video, may be overlaid with a touch screen to facilitate interaction with the player. In the illustrated embodiment, the gaming machine 10 is an "upright" version in which the display 12 is oriented vertically relative to the player. Alternatively, the gaming machine may be a "slant-top" version in which the display 12 is slanted at about a thirty-degree angle toward the player of the gaming machine 10.

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FIG. 2 is a block diagram of a control system suitable for operating the gaming machine. Money/credit detector 16 signals a central processing unit (CPU) 18 when a player has inserted money or played a number of credits. The money may be provided by coins, bills, tickets, coupons, cards, etc. Using a button panel 14 (see FIG. 1) or a touch screen 20, the player may select any variables associated with the wagering game and place his/her wager to purchase a play of the game. In a play of the game, the CPU 18 generates at least one random event using a random number generator (RNG) and provides an award to the player for a winning outcome of the random event. The CPU 18 operates the displays 12, 26, and 28 to represent the random events and outcomes in a visual form that can be understood by the player. In addition to the CPU 18, the control system may include one or more additional slave control units for operating one or more of the displays 12, 26, and 28.

A system memory 22 stores control software, operational instructions and data associated with the gaming machine. In one embodiment, the system memory 22 comprises a separate read-only memory (ROM) and battery-backed random-access memory (RAM). However, it will be appreciated that the system memory 22 may be implemented on any of several alternative types of memory structures or may be implemented on a single memory structure. A payoff mechanism 24 is operable in response to instructions from the CPU 18 to award a payoff to the player. The payoff may, for example, be in the form of a number of credits. The number of credits are determined by one or more math tables stored in the system memory 22.

By way of example, the gaming machine may conduct a wagering game including a basic reel slot game and a bonus game. The bonus game is triggered by a start-bonus outcome in the basic slot game. Referring to FIG. 3, to play the basic slot game, a player places a wager using a "bet one" key or a "max bet" key on the button panel 14. In response to pressing the "max bet" key, or a "spin reels" key for a wager less than the maximum, the CPU spins and randomly stops a plurality of symbol-bearing reels 30 to place symbols on the reels 30 in visual association with at least one pay line 32. Other mechanisms, such as a handle 34 (see FIG. 1), may be used to set the reels 30 in motion. Additional pay lines may be provided, in which case the player is allowed to wager on more than one pay line. The number of illustrated reels is three but a different number of reels may be provided if desired. The display 12 on

which the reels are implemented may be mechanical or video. If the display 12 is mechanical, the reels are physical and rotatably driven by stepper motors. If, however, the display 12 is video, the reels are simulated with moving graphics.

5 The CPU uses a random number generator to select a game outcome (e.g., "basic" game outcome) corresponding to a particular set of reel "stop positions." The CPU then causes each of the reels 30 to stop at the appropriate stop position. Symbols are displayed on the reels 30 to graphically illustrate the reel stop positions and indicate whether the stop positions of the reels 30 represent a winning game outcome.

10 Winning basic game outcomes (e.g., symbol combinations resulting in payment of coins or credits) are identifiable to the player by a pay table. In one embodiment, the pay table is affixed to the machine and/or displayed by the video display 26 in response to a command by the player (e.g., by pressing a "Pay Table" key on the button panel 14). A winning basic game outcome occurs when the
15 symbols appearing on the reels 30 along the pay line 32 correspond to one of the winning combinations on the pay table. A winning combination, for example, could be three or more matching symbols along the pay line 32, where the award is greater as the number of matching symbols along the pay line 32 increases. If the displayed symbols stop in a winning combination, the game credits the player an amount
20 corresponding to the award in the pay table for that combination multiplied by the number of wagered credits. The player may collect the amount of accumulated credits by pressing a "Collect" key on the button panel 14.

Included among the plurality of basic game outcomes is a start-bonus outcome for triggering play of a bonus game. A start-bonus outcome may be defined in any
25 number of ways. For example, a start-bonus outcome may occur when a special start-bonus symbol or a special combination of symbols appears on one or more of the reels 30. The start-bonus outcome may require the combination of symbols to appear along the pay line 32, or may alternatively require that the combination of symbols appear anywhere on the display regardless of whether the symbols are along the pay
30 line 32. The appearance of the start-bonus outcome causes the CPU to shift operation from the basic slot game to the bonus game. Referring to FIG. 4, in the illustrated

example the start-bonus outcome consists of three CLAW symbols 36 along the pay line 32.

Referring to FIGS. 5 and 6, the mechanical display 28 includes a physical element in the form of a physical claw 40 for grabbing prizes. The physical claw 40 is slidably mounted to a horizontal bar 42 and is adapted to extend downward from the retracted position shown in FIG. 5. When the bonus game is triggered, the physical claw 40 begins to move back and forth along the bar 42. The player is prompted to press a "Grab" key on the button panel 14 (see FIG. 1) when the physical claw 40 moves to a location liked by the player.

Referring to FIG. 7, in response to pressing the "Grab" key, the physical claw 40 extends downward toward the video display 26 and disappears behind indicia of prizes 44. The indicia of prizes 44 may, for example, include gems, jewelry, watches, precious metals, and toys. The mechanical display 28 preferably includes a front panel 46 composed, for example, of glass or plastic. The prize indicia 44 may merely be represented by artwork printed on this front panel 46, or may alternatively be represented by actual physical objects piled inside a front section of the mechanical display 28 and visible through a transparent front panel 46. In the latter embodiment, the physical objects would look like valuable prizes but would preferably have nominal actual value.

In its fully extended position the physical claw 40 may only be located behind the indicia of prizes 44 on the mechanical display 28, or may alternatively be extended further into an empty space behind the video display 26. In the latter embodiment, to be able to accommodate the physical claw 40 in an empty space behind the video display 26, the video display 26 would be implemented with a slim structure, such as an LCD, having a reduced depth.

When the bonus game commences, the video display 26 initially depicts a video image including a pile of video prizes 48. The pile of video prizes 48 on the video display 26 is similar to the indicia of prizes 44 on the mechanical display 28 and may therefore include such prizes as gems, jewelry, watches, precious metals, and toys. As the physical claw 40 appears to be lowered into the indicia of prizes 44 on the mechanical display 28 but is actually lowered behind the indicia of prizes 44, the video display 26 depicts a video element 50 in the form of a video claw. The video

claw 50 is substantially similar in appearance to the physical claw 40. The control system of the gaming machine operates the video display 26 and the mechanical display 28 such that the video claw 50 and the physical claw 40 appear to visually interact with and be linked to each other. Specifically, the physical claw 40 on the mechanical display 28 is lowered until it disappears and then almost seamlessly reappears as the video claw 50 on the video display 26. The physical claw 40 appears to move from the mechanical display 28 to the video display 26 and become the video claw 50.

Referring to FIG. 8, the video display 26 proceeds to depict the video claw 50 being lowered into the pile of video prizes 48 and grab one of the prizes. The grabbed prize 52 yields a bonus game award such as a number of credits (e.g., 75 credits in FIG. 8). The video display 26 may then depict the video claw 50 dropping the grabbed prize 52 back into the pile of video prizes 48. To conclude the bonus game, the control system may operate the video display 26 and the mechanical display 28 such that the video claw 50 and the physical claw 40 again appear to visually interact with and be linked to each other. Specifically, as the video claw 50 appears to retract (move upward) from the pile of video prizes 48 and reaches the top of the video display 26, the video claw 50 appears to move from the video display 26 to the mechanical display 28 and become the physical claw 40. The physical claw 40 continues to retract until reaching the fully retracted position in FIG. 5. The CPU then shifts operation back to the basic slot game ready to receive a new wager to play the wagering game.

While the present invention has been described with reference to one or more particular embodiments, those skilled in the art will recognize that many changes may be made thereto without departing from the spirit and scope of the present invention. The gaming machine may be operable to play wagering games having different play formats and themes. Therefore, the control system may operate the video display 26 and the mechanical display 28 such that elements besides the claws 40 and 50 appear to visually interact with each other.

The wagering game may, for example, have a fishing theme. In this case, the mechanical display 28 may include a fishing reel with physical bait (e.g., fake worm or lure) at the end of a short fishing line. During the bonus game, the video display 26

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may depict an underwater scene of swimming fish. To display a bonus yielded by the bonus game, the fishing line is extended until the physical bait on the mechanical display 28 disappears and then almost seamlessly reappears as video bait on the video display 26. The video display 26, in turn, depicts one of the fish being captured by the video bait. The captured fish is worth a number of credits. In a more extravagant implementation, the mechanical display 28 may include a tank of actual water colored blue for enhanced effect. While the captured fish is reeled in on the video display 26, the video display 26 may depict a flurry of bubbles around the struggling fish and the mechanical display 28 may create a splash or ripple at the surface of the actual water in its tank.

CLAIMS:

1. A gaming machine for conducting a wagering game, comprising:
a video display for displaying a video element;
a mechanical display for displaying a movable physical element; and
5 a control system for operating the video display and the mechanical display
such that the video element and the physical element appear to visually
interact with each other.
2. The machine of claim 1, wherein the control system operates the mechanical
10 display to move the physical element from alongside the video display to behind
video display.
3. The machine of claim 2, wherein the physical element is a claw-shaped
member for grabbing prizes.
- 15 4. The machine of claim 1, wherein the control system operates the video display
and the mechanical display such that the video element and the physical element
appear to be linked to each other.
- 20 5. The machine of claim 1, wherein the video element and the physical element
provide respective actions, the control system operating the video display and the
mechanical display such that the actions appear to be linked to each other.
6. The machine of claim 5, wherein the action of the video element appears to
25 cause the action of the physical element.
7. The machine of claim 5, wherein the action of the physical element appears to
cause the action of the video element.

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8. The machine of claim 1, wherein the control system operates the video display and the mechanical display such that the physical element appears to move to the video display and become the video element.
- 5 9. The machine of claim 1, wherein the control system operates the video display and the mechanical display such that the video element appears to move to the mechanical display and become the physical element.
- 10 10. The machine of claim 1, further including a wagering apparatus for receiving a wager to play the wagering game, the control system conducting the wagering game.
- 15 11. The machine of claim 10, wherein the wagering game includes a basic game and a bonus game, the bonus game being triggered by a start-bonus outcome in the basic game, apparent interaction of the video element and the physical element occurring during the bonus game.
12. The machine of claim 11, wherein the bonus game includes an outcome indicated by the apparent interaction of the video element and the physical element.
- 20 13. A gaming machine for conducting a wagering game, comprising:
a video display;
a mechanical display proximate to the video display; and
a control system for operating the video display and the mechanical display
such that an object appears to move between the video display and the
25 mechanical display.
14. A gaming machine for conducting a wagering game, comprising:
a video display;
a mechanical display proximate to the video display; and
30 a control system for operating the video display and the mechanical display
such that elements on the respective video display and the mechanical
display appear to visually interact with each other.

15. A method of conducting a wagering game, comprising:
displaying a video element on a video display;
displaying a movable physical element on a mechanical display; and
operating the video display and the mechanical display such that the video
element and the physical element appear to visually interact with each
other.
16. The method of claim 15, wherein the operating step includes operating the
mechanical display to move the physical element from alongside the video display to
behind video display.
17. The method of claim 16, wherein the physical element is a claw-shaped
member for grabbing prizes.
18. The method of claim 15, wherein the operating step includes operating the
video display and the mechanical display such that the video element and the physical
element appear to be linked to each other.
19. The method of claim 15, wherein the video element and the physical element
provide respective actions, wherein the operating step includes operating the video
display and the mechanical display such that the actions appear to be linked to each
other.
20. The method of claim 19, wherein the action of the video element appears to
cause the action of the physical element.
21. The method of claim 19, wherein the action of the physical element appears to
cause the action of the video element.

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22. The method of claim 15, wherein the operating step includes operating the video display and the mechanical display such that the physical element appears to move to the video display and become the video element.
- 5 23. The method of claim 15, wherein the operating step includes operating the video display and the mechanical display such that the video element appears to move to the mechanical display and become the physical element.
24. The method of claim 15, further including receiving a wager to play the
10 wagering game and conducting the wagering game.
25. The method of claim 24, wherein the wagering game includes a basic game and a bonus game, the bonus game being triggered by a start-bonus outcome in the basic game, and wherein the operating step occurs during the bonus game.
- 15 26. The method of claim 25, wherein the operating step is indicative of an outcome in the bonus game.



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Application No: GB 0310857.8
Claims searched: 1 - 26

Examiner: Tom Sutherland
Date of search: 25 September 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance	
X	1, 4, 7, 10 14, 15	GB 2083936 A	(COIN OPERATED PARTS) See Fig. 1 and page 1 lines 104 to 112 and page 1 line 125 to page 2 line 6. Positions of mechanical reels 2, 3, 4 and video display 5 visually linked.
X, P	1, 4, 7, 10 14, 15	EP 1260928 A	(WMS) See the Figs and col. 2 lines 45 and 46.
A		GB 2292246 A	(ECLIPSE) See Fig. 1, "fruit" machine and crane-type bonus game.
A		US 5967892	(SHOEMAKER) See Figs 1 and 4.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^V:

G4V, A6H

Worldwide search of patent documents classified in the following areas of the IPC⁷:

A63F, G07F

The following online and other databases have been used in the preparation of this search report:

EPODOC, WPI, JAPIO

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